Complete Summary

GUIDELINE TITLE

Plague as a biological weapon. Medical and public health management.

BIBLIOGRAPHIC SOURCE(S)

Inglesby TV, Dennis DT, Henderson DA, Bartlett JG, Ascher MS, Eitzen E, Fine AD, Friedlander AM, Hauer J, Koerner JF, Layton M, McDade J, Osterholm MT, O'Toole T, Parker G, Perl TM, Russell PK, Schoch-Spana M, Tonat K. Plague as a biological weapon: medical and public health management. Working Group on Civilian Biodefense. JAMA 2000 May 3;283(17):2281-90. [72 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Exposure to or infection with plague (Yersinia pestis)

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Treatment

CLINICAL SPECIALTY

Emergency Medicine
Family Practice
Infectious Diseases
Internal Medicine
Obstetrics and Gynecology

Pathology
Pediatrics
Preventive Medicine

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Clinical Laboratory Personnel
Hospitals
Nurses
Physician Assistants
Physicians
Public Health Departments

GUIDELINE OBJECTIVE(S)

To develop consensus-based recommendations for measures to be taken by medical and public health professionals following the use of plague as a biological weapon against a civilian population

TARGET POPULATION

Adults, pregnant women, children and immunosuppressed persons exposed to or infected with plague (Yersinia pestis) as a biological weapon

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. Assessment of clinical and epidemiological features
2. Immediate notification of the hospital epidemiologist or infection control practitioner, health department, and the local or state health laboratory
3. Clinical microbiologic studies: Gram stain of sputum or blood; a Wright, Giemsa, or Wayson stain; direct fluorescent antibody testing; cultures of sputum, blood, or lymph node aspirate
4. Laboratory studies to confirm a suspected diagnosis: antigen detection, immunoglobulin M enzyme immunoassay, immunostaining, and polymerase chain reaction (available only at some state health departments, the Centers for Disease Control and Prevention (CDC), and military laboratories); passive hemagglutination antibody (of retrospective value)
5. Chest radiography

Treatment/Postexposure Prophylaxis

1. Advanced medical supportive care, as needed for patients with pneumonic plague
2. Pharmacotherapy for pneumonic plague infection in the contained casualty setting:
    - Preferred therapy: Streptomycin, gentamicin (adults, children); gentamicin (pregnant women)

- Alternative therapy: Doxycycline, ciprofloxacin, chloramphenicol (adults, children); doxycycline, ciprofloxacin (pregnant women); other fluoroquinolones can be substituted for ciprofloxacin, as appropriate for age

Note: Therapy for immunosuppressed individuals would be the same as for immunocompetent adults or children

3. Pharmacotherapy for pneumonic plague infection in mass casualty setting and postexposure prophylaxis:
    - Preferred therapy: Doxycycline, ciprofloxacin (adults, children, pregnant women). Tetracycline can be substituted for doxycycline. In adults, other fluoroquinolones can be substituted for ciprofloxacin as appropriate
    - Alternative therapy: Chloramphenicol (adults, age appropriate children, pregnant women)

    Note: Therapy for immunosuppressed individuals would be the same as for immunocompetent adults or children

Note: Sulfonamides are discussed for the treatment of plague, however no specific recommendations are offered. Rifampin, aztreonam, ceftazidime, cefotetan, and cefazolin are not recommended.

Infection Control

1. Antibiotic prophylaxis
2. Surveillance of close contacts refusing antibiotic prophylaxis
3. Respiratory droplet precautions (disposable surgical masks, gown, gloves, eye protection)
4. Standard hospital precautions
5. Microbiology laboratory biosafety precautions
6. Strict precautions in handling of bodies of patients who have died following infection with plague

MAJOR OUTCOMES CONSIDERED

Therapeutic efficacy

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases
Searches of Unpublished Data

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

MEDLINE databases were searched from January 1966 to June 1998 for the Medical Subject Headings plague, Yersinia pestis, biological weapon, biological terrorism, biological warfare, and biowarfare. Review of the bibliographies of the references identified by this search led to subsequent identification of relevant references published prior to 1966. In addition, participants identified other unpublished references and sources. Additional MEDLINE searches were conducted through January 2000.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not applicable

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The first draft of the working group's consensus statement was a synthesis of information obtained in the initial formal evidence-gathering process. Members of the working group were asked to make formal written comments on this first draft of the document in September 1998. The document was revised incorporating changes suggested by members of the working group, which was convened to review the second draft of the document on October 30, 1998. Following this meeting and a second meeting of the working group on May 24, 1999, a third draft of the document was completed, reviewed, and revised. Working group members had a final opportunity to review the document and suggest revisions. The final document incorporates all relevant evidence obtained by the literature search in conjunction with consensus recommendations supported by all working group members.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Six external reviewers are acknowledged in the guideline document.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Diagnosis

Given the rarity of plague infection and the possibility that early cases are a harbinger of a larger epidemic, the first clinical or laboratory suspicion of plague must lead to immediate notification of the hospital epidemiologist or infection control practitioner, health department, and the local or state health laboratory. Definitive tests can thereby be arranged rapidly through a state reference laboratory or, as necessary, the Diagnostic and Reference Laboratory of the Centers for Disease Control and Prevention and early interventions instituted.

The early diagnosis of plague requires a high index of suspicion in naturally occurring cases and even more so following the use of a biological weapon. There are no effective environmental warning systems to detect an aerosol of plague bacilli.

The first indication of a clandestine terrorist attack with plague would most likely be a sudden outbreak of illness presenting as severe pneumonia and sepsis. If there are only small numbers of cases, the possibility of them being plague may be at first overlooked given the clinical similarity to other bacterial or viral pneumonias and that few Western physicians have ever seen a case of pneumonic plague. However, the sudden appearance of a large number of previously healthy patients with fever, cough, shortness of breath, chest pain, and a fulminant course leading to death should immediately suggest the possibility of pneumonic plague or inhalational anthrax. The presence of hemoptysis in this setting would strongly suggest plague (see Table 1 below).

Table 1. Diagnosis of Pneumonic Plague Infection Following Use of a Biological Weapon

Epidemiology	Sudden appearance of many persons with fever, cough,

and symptoms	shortness of breath, hemoptysis, and chest pain
	Gastrointestinal symptoms common (e.g., nausea, vomiting, abdominal pain, and diarrhea)
	Patients have fulminant course and high mortality
Clinical signs	Tachypnea, dyspnea, and cyanosis
	Pneumonic consolidation or chest examination
	Sepsis, shock, and organ failure
	Infrequent presence of cervical bubo
	(Purpuric skin lesions and necrotic digits only in advanced disease)
Laboratory studies	Sputum, blood, or lymph node aspirate
	Gram-negative bacilli with bipolar (safety pin) staining on Wright, Giemsa, or Wayson stain
	Rapid diagnostic tests available only at some health departments, the Centers for Disease Control and Prevention, and military laboratories
	Pulmonary infiltrates or consolidation on chest radiograph
Pathology	Lobular exudation, bacillary aggregation, and areas of necrosis in pulmonary parenchyma

There are no widely available rapid diagnostic tests for plague. Tests that would be used to confirm a suspected diagnosis - antigen detection, immunoglobulin M (IgM) enzyme immunoassay, immunostaining, and polymerase chain reaction - are available only at some state health departments, the Centers for Disease Control and Prevention (CDC), and military laboratories. The routinely used passive hemagglutination antibody detection assay is typically only of retrospective value since several days to weeks usually pass after disease onset before antibodies develop.

Microbiologic studies are important in the diagnosis of pneumonic plague. A Gram stain of sputum or blood may reveal gram-negative bacilli or coccobacilli. A Wright, Giemsa, or Wayson stain will often show bipolar staining (see Figure 1 in the original guideline document), and direct fluorescent antibody testing, if available, may be positive. In the unlikely event that a cervical bubo is present in pneumonic plague, an aspirate (obtained with a 20-gauge needle and a 10-mL syringe containing 1-2 mL of sterile saline for infusing the node) may be cultured and similarly stained (see Table 1 above).

Cultures of sputum, blood, or lymph node aspirate should demonstrate growth approximately 24 to 48 hours after inoculation. Most microbiology laboratories use either automated or semiautomated bacterial identification systems. Some of these systems may misidentify Yersinia pestis. In laboratories without automated bacterial identification, as many as 6 days may be required for identification, and there is some chance that the diagnosis may be missed entirely. Approaches for biochemical characterization of Yersinia pestis are described in detail elsewhere.

If a laboratory using automated or nonautomated techniques is notified that plague is suspected, it should split the culture: 1 culture incubated at 28Â°C for rapid growth and the second culture incubated at 37Â°C for identification of the diagnostic capsular (F_1) antigen. Using these methods, up to 72 hours may be required following specimen procurement to make the identification. Antibiotic susceptibility testing should be performed at a reference laboratory because of the lack of standardized susceptibility testing procedures for Yersinia pestis. A process establishing criteria and training measures for laboratory diagnosis of this disease is being undertaken jointly by the Association of Public Health Laboratories and the Centers for Disease Control and Prevention.

Vaccination

No vaccine is currently available. Refer to the original guideline document for discussion.

Therapy

Recommendations for Antibiotic Therapy

The working group treatment recommendations are based on literature reports on treatment of human disease, reports of studies in animal models, reports on in vitro susceptibility testing, and antibiotic safety. Should antibiotic susceptibility testing reveal resistance, proper antibiotic substitution would need to be made.

In a contained casualty setting, a situation in which a modest number of patients require treatment, the working group recommends parenteral antibiotic therapy as shown in Table 2 of the original guideline document. Preferred parenteral forms of the antimicrobials streptomycin or gentamicin are recommended. However, in a mass casualty setting, intravenous or intramuscular therapy may not be possible for reasons of patient care logistics and/or exhaustion of equipment and antibiotic supplies, and parenteral therapy will need to be supplanted by oral therapy. In a mass casualty setting, the working group recommends oral therapy, preferably with doxycycline (or tetracycline) or ciprofloxacin (see Table 2 in the original guideline document).

Patients with pneumonic plague will require substantial advanced medical supportive care in addition to antimicrobial therapy. Complications of gram-negative sepsis would be expected, including adult respiratory distress syndrome, disseminated intravascular coagulation, shock, and multiorgan failure.

Once it was known or strongly suspected that pneumonic plague cases were occurring, anyone with fever or cough in the presumed area of exposure should

be immediately treated with antimicrobials for presumptive pneumonic plague. Delaying therapy until confirmatory testing is performed would greatly decrease survival. Clinical deterioration of patients despite early initiation of empiric therapy could signal antimicrobial resistance and should be promptly evaluated.

Management of Special Groups

Consensus recommendations for special groups as set forth in the following reflect the clinical and evidence-based judgments of the working group and do not necessarily correspond to Food and Drug Administration (FDA) approved use, indications, or labeling.

Children. The treatment of choice for plague in children has been streptomycin or gentamicin. If aminoglycosides are not available or cannot be used, recommendations for alternative antimicrobial treatment with efficacy against plague are conditioned by balancing risks associated with treatment against those posed by pneumonic plague. Children aged 8 years and older can be treated with tetracycline antibiotics safely. However, in children younger than 8 years, tetracycline antibiotics may cause discolored teeth, and rare instances of retarded skeletal growth have been reported in infants. Chloramphenicol is considered safe in children except for children younger than 2 years who are at risk of "gray baby syndrome." Some concern exists that fluoroquinolone use in children may cause arthropathy, although fluoroquinolones have been used to treat serious infections in children. No comparative studies assessing efficacy or safety of alternative treatment strategies for plague in children has or can be performed.

Given these considerations, the working group recommends that children in the contained casualty setting receive streptomycin or gentamicin. In a mass casualty setting or for postexposure prophylaxis, we recommend that doxycycline be used. Alternatives are listed for both settings (see Table 2 in the original guideline document). The working group assessment is that the potential benefits of these antimicrobials in the treating of pneumonic plague infection substantially outweigh the risks.

Pregnant Women. It has been recommended that aminoglycosides be avoided in pregnancy unless severe illness warrants, but there is no more efficacious treatment for pneumonic plague. Therefore, the working group recommends that pregnant women in the contained casualty setting receive gentamicin (see Table 2 in the original guideline document). Since streptomycin has been associated with rare reports of irreversible deafness in children following fetal exposure, this medication should be avoided if possible. The tetracycline class of antibiotics has been associated with fetal toxicity including retarded skeletal growth, although a large case-control study of doxycycline use in pregnancy showed no significant increase in teratogenic risk to the fetus. Liver toxicity has been reported in pregnant women following large doses of intravenous tetracycline (no longer sold in the United States), but it has also been reported following oral administration of tetracycline to nonpregnant individuals. Balancing the risks of pneumonic plague infection with those associated with doxycycline use in pregnancy, the working group recommends that doxycycline be used to treat pregnant women with pneumonic plague if gentamicin is not available.

Of the oral antibiotics historically used to treat plague, only trimethoprim-sulfamethoxazole has a category C pregnancy classification; however, many experts do not recommend trimethoprim-sulfamethoxazole for treatment of pneumonic plague. Therefore, the working group recommends that pregnant women receive oral doxycycline for mass casualty treatment or postexposure prophylaxis. If the patient is unable to take doxycycline or the medication is unavailable, ciprofloxacin or other fluoroquinolones would be recommended in the mass casualty setting (see Table 2 in the original guideline document).

The working group recommendation for treatment of breastfeeding women is to provide the mother and infant with the same antibiotic based on what is most safe and effective for the infant: gentamicin in the contained casualty setting and doxycycline in the mass casualty setting. Fluoroquinolones would be the recommended alternative (see Table 2 in the original guideline document).

Immunosuppressed Persons. The antibiotic treatment or postexposure prophylaxis for pneumonic plague among those who are immunosuppressed has not been studied in human or animal models of pneumonic plague infection. Therefore, the consensus recommendation is to administer antibiotics according to the guidelines developed for immunocompetent adults and children.

Postexposure Prophylaxis Recommendations

The working group recommends that in a community experiencing a pneumonic plague epidemic, all persons developing a temperature of 38.5Â°C or higher or new cough should promptly begin parenteral antibiotic treatment. If the resources required to administer parenteral antibiotics are unavailable, oral antibiotics should be used according to the mass casualty recommendations (see Table 2 in the original guideline document). For infants in this setting, tachypnea would also be an additional indication for immediate treatment. Special measures would need to be initiated for treatment or prophylaxis of those who are either unaware of the outbreak or require special assistance, such as the homeless or mentally handicapped persons. Continuing surveillance of patients would be needed to identify individuals and communities at risk requiring postexposure prophylaxis.

Asymptomatic persons having household, hospital, or other close contact with persons with untreated pneumonic plague should receive postexposure antibiotic prophylaxis for 7 days and watch for fever and cough. Close contact is defined as contact with a patient at less than 2 meters. Tetracycline, doxycycline, sulfonamides, and chloramphenicol have each been used or recommended as postexposure prophylaxis in this setting. Fluoroquinolones could also be used based on studies in mice.

The working group recommends the use of doxycycline as the first choice antibiotic for postexposure prophylaxis; other recommended antibiotics are noted (see Table 2 in the original guideline document). Contacts who develop fever or cough while receiving prophylaxis should seek prompt medical attention and begin antibiotic treatment as described in Table 2 of the original guideline document.

Infection Control

Previous public health guidelines have advised strict isolation for all close contacts of patients with pneumonic plague who refuse prophylaxis. In the modern setting, however, pneumonic plague has not spread widely or rapidly in a community, and therefore isolation of close contacts refusing antibiotic prophylaxis is not recommended by the working group. Instead, persons refusing prophylaxis should be carefully watched for the development of fever or cough during the first 7 days after exposure and treated immediately should either occur.

Modern experience with person-to-person spread of pneumonic plague is limited; few data are available to make specific recommendations regarding appropriate infection control measures. The available evidence indicates that person-to-person transmission of pneumonic plague occurs via respiratory droplets; transmission by droplet nuclei has not been demonstrated. In large pneumonic plague epidemics earlier this century, pneumonic plague transmission was prevented in close contacts by wearing masks. Commensurate with this, existing national infection control guidelines recommend the use of disposable surgical masks to prevent the transmission of pneumonic plague.

Given the available evidence, the working group recommends that, in addition to beginning antibiotic prophylaxis, persons living or working in close contact with patients with confirmed or suspect pneumonic plague that have had less than 48 hours of antimicrobial treatment should follow respiratory droplet precautions and wear a surgical mask. Further, the working group recommends avoidance of unnecessary close contact with patients with pneumonic plague until at least 48 hours of antibiotic therapy and clinical improvement has taken place. Other standard respiratory droplet precautions (gown, gloves, and eye protection) should be used as well.

The patient should remain isolated during the first 48 hours of antibiotic therapy and until clinical improvement occurs. If large numbers of patients make individual isolation impossible, patients with pneumonic plague may be cohorted while undergoing antibiotic therapy. Patients being transported should also wear surgical masks. Hospital rooms of patients with pneumonic plague should receive terminal cleaning in a manner consistent with standard precautions, and clothing or linens contaminated with body fluids of patients infected with plague should be disinfected as per hospital protocol.

Microbiology laboratory personnel should be alerted when Yersinia pestis is suspected. Four laboratory-acquired cases of plague have been reported in the United States. Simple clinical materials and cultures should be processed in biosafety level 2 conditions. Only during activities involving high potential for aerosol or droplet production (e.g., centrifuging, grinding, vigorous shaking, and animal studies) are biosafety level 3 conditions necessary.

Bodies of patients who have died following infection with plague should be handled with routine strict precautions. Contact with the remains should be limited to trained personnel, and the safety precautions for transporting corpses for burial should be the same as those when transporting ill patients. Aerosol-generating procedures, such as bone-sawing associated with surgery or postmortem examinations, would be associated with special risks of transmission and are not recommended. If such aerosol-generating procedures are necessary, then high-efficiency particulate air filtered masks and negative-pressure rooms

should be used as would be customary in cases in which contagious biological aerosols, such as Mycobacterium tuberculosis, are deemed a possible risk.

Environmental Decontamination

There is no evidence to suggest that residual plague bacilli pose an environmental threat to the population following the dissolution of the primary aerosol. There is no spore form in the Yersinia pestis life cycle, so it is far more susceptible to environmental conditions than sporulating bacteria such as Bacillus anthracis. Moreover, Yersinia pestis is very sensitive to the action of sunlight and heating and does not survive long outside the host. Although some reports suggest that the bacterium may survive in the soil for some time, there is no evidence to suggest environmental risk to humans in this setting and thus no need for environmental decontamination of an area exposed to an aerosol of plague. In the World Health Organization (WHO) analysis, in a worst case scenario, a plague aerosol was estimated to be effective and infectious for as long as 1 hour. In the setting of a clandestine release of plague bacilli, the aerosol would have dissipated long before the first case of pneumonic plague occurred.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The working group treatment recommendations are based on literature reports on treatment of human disease, reports of studies in animal models, reports on in vitro susceptibility testing, and antibiotic safety. Consensus recommendations for special groups reflect the clinical and evidence-based judgments of the working group. Infection control recommendations are based on the best available evidence.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Improved diagnosis, management and containment of plague following a bioterrorist attack

POTENTIAL HARMS

General Population

- Chloramphenicol has been associated with dose dependent hematologic abnormalities and with rare idiosyncratic fatal aplastic anemia.

Children

- Tetracycline antibiotics may cause discolored teeth in children younger than 8 years. Rare instances of retarded skeletal growth have been reported in infants.
- Fluoroquinolone use in children may cause arthropathy, although fluoroquinolones have been used to treat serious infections in children.

Pregnant women

- The tetracycline class of antibiotics has been associated with fetal toxicity including retarded skeletal growth, although a large case-control study of doxycycline use in pregnancy showed no significant increase in teratogenic risk to the fetus. Liver toxicity has been reported in pregnant women following large doses of intravenous tetracycline (no longer sold in the United States), but it has also been reported following oral administration of tetracycline to nonpregnant individuals.

Note: Balancing risks against the serious risk of infection following a plague attack is considered in the guideline.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- Recommendations for the use of antibiotics following a plague biological weapon exposure are conditioned by the lack of published trials in treating plague in humans, limited number of studies in animals, and possible requirement to treat large numbers of persons. A number of possible therapeutic regimens for treating plague have yet to be adequately studied or submitted for approval to the Food and Drug Administration (FDA). For these reasons, the working group offers consensus recommendations based on the best available evidence. The recommendations do not necessarily represent uses currently approved by the FDA or an official position on the part of any of the federal agencies whose scientists participated in these discussions. Recommendations will need to be revised as further relevant information becomes available.
- Consensus recommendations for special groups as set forth in the guideline reflect the clinical and evidence-based judgments of the working group and do not necessarily correspond to FDA approved use, indications, or labeling.
- The antibiotic treatment or postexposure prophylaxis for pneumonic plague among those who are immunosuppressed has not been studied in human or animal models of pneumonic plague infection.
- Modern experience with person-to-person spread of pneumonic plague is limited; few data are available to make specific recommendations regarding appropriate infection control measures.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness
Safety
Timeliness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Inglesby TV, Dennis DT, Henderson DA, Bartlett JG, Ascher MS, Eitzen E, Fine AD, Friedlander AM, Hauer J, Koerner JF, Layton M, McDade J, Osterholm MT, O'Toole T, Parker G, Perl TM, Russell PK, Schoch-Spana M, Tonat K. Plague as a biological weapon: medical and public health management. Working Group on Civilian Biodefense. JAMA 2000 May 3;283(17):2281-90. [72 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2000 Oct 4

GUIDELINE DEVELOPER(S)

Center for Biosecurity - Academic Institution

GUIDELINE DEVELOPER COMMENT

The working group comprised 25 representatives from major academic medical centers and research, government, military, public health, and emergency management institutions and agencies, including:

- The Center for Civilian Biodefense Strategies, the School of Medicine, and the School of Public Health, Johns Hopkins University
- National Center for Infectious Diseases
- Centers for Disease Control and Prevention
- Viral and Rickettsial Diseases, California Department of Health
- US Army Medical Research Institute of Infectious Diseases
- Science Application International Corporation
- Office of Communicable Disease, New York City Health Department

- Office of Emergency Preparedness, Department of Health and Human Services
- Infection Control Advisory Network Inc.

SOURCE(S) OF FUNDING

Funding for the development of this working group document was primarily provided by each representative's individual institution or agency; the Johns Hopkins Center for Civilian Biodefense Strategies provided travel funds for 5 members of the group.

GUIDELINE COMMITTEE

Working Group on Civilian Biodefense

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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Ex Officio Participants in the Working Group on Civilian Biodefense: George Counts, MD; Margaret Hamburg, MD; Robert Knouss, MD; Brian Malkin; Stuart Nightingale, MD; William Raub, PhD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

An update is not in progress at this time.

GUIDELINE AVAILABILITY

Electronic copies: Available from the Journal of the American Medical Association Web site.

Full text available in:

- HTML Format
- Portable Document Format (PDF)

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on November 1, 2001.

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